



Occurences of stability classes, wind speeds, and wind directions as observed at Risø

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Publication date:
1973

Document Version
Publisher's PDF, also known as Version of record

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Citation (APA):
Jensen, N. O. (1973). *Occurences of stability classes, wind speeds, and wind directions as observed at Risø*. Risø National Laboratory. Risø-M No. 1666

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Risø - M - 1666

<p>Title and author(s)</p> <p>Occurrences of stability classes, wind speeds, and wind directions as observed at Risø.</p> <p>by</p> <p>Niels Otto Jensen</p>	<p>Date November 14, 1973</p> <p>Department or group Physics Department</p> <p>Group's own registration number(s)</p>
<p>37 pages + 19 tables + 12 illustrations</p>	
<p>Abstract</p> <p>The meteorological data subject to analysis were measured at Risø during the years 1958 through 1967. The data are grouped in 12 wind direction sectors, 7 stability categories, and 5 wind-speed intervals. The number of observations in each group is given in tabular form. Some results are expressed also by means of wind roses.</p> <p>Available on request from the Library of the Danish Atomic Energy Commission (Atomenergikommisionens Bibliotek), Risø, DK-4000 Roskilde, Denmark Telephone: (03) 35 51 01, ext. 334, telex: 43116</p>	<p>Copies to</p>

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Contents

	Page
The measurements	1
The analysis	2
Representation	4
Graphs	17
Tables	30
References	37

The measurements

The data used in this analysis were obtained by measurements along the Rise tower in the period from February 1st, 1958 to December 31st, 1967.

The temperatures are "instantaneous" values obtained every full hour on the hour by means of aspirated platinum resistance thermometers. The resolution with which the temperatures are specified is $0,1^{\circ}\text{C}$.

The wind speeds and directions are ten minute averages centered on every full hour. Only the 123 m level is used.

The wind speeds were given to the nearest half meter per second during the period from 1958 through 1962 and thereafter to the nearest tenth of a meter per second. The wind directions were truncated to the nearest tens of degrees.

For further information about the instrumentation, see ref. 1, 2, 3, 4.

The analysis

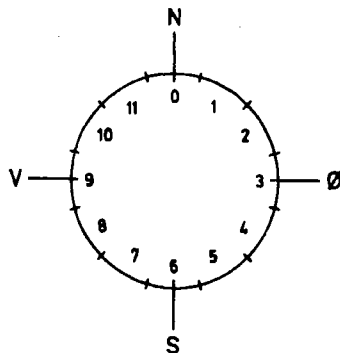
The data were subdivided into classes of wind directions, wind speed, and stability as follows :

Wind-speed groups:

group	1	2	3	4	5
	$u < 1$	$1 \leq u < 3$	$3 \leq u < 6$	$6 \leq u < 10$	$u \geq 10$

where u is the wind-speed in meters per second.

Wind-direction sectors:



The specification of the sectors is such that in sector 2, say the wind is coming from a direction in the interval from 45° to 75° .

Stability classes :

The stability was determined from the temperature profile as suggested in ref. 5.

Stability class	Pasquill category	Temp. gradient $^\circ\text{C}$ per 100 m
1	A	$< -1,9$
2	B	$-1,9$ to $-1,7$
3	C	$-1,7$ to $-1,5$
4	D	$-1,5$ to $-0,5$
5	E	$-0,5$ to $1,5$
6	F	$1,5$ to 4
7	G	> 4

The temperature gradients were calculated by means of a first order regression line fitted to the vertical temperature profiles. The temperature data were corrected according to a procedure suggested by E. W. Peterson, ref. 6.

Representation

On each of the following 12 pages are given a wind sector and the probability (frequency of occurrence) of having the wind direction in this sector. The distribution on stability and wind-speed groups are also given.

The probabilities are conditional. The probability of having a wind direction in sector N and a wind speed in group C, under atmospheric conditions which are described by a temperature gradient in group S is then :

$$P = P_n \cdot P_c \cdot P_s$$

where P_n is the probability for wind sector N, P_s is the probability for stability group S, and P_c is the probability for wind-speed group C.

WINDSECTOR 0
4050 OBSERVATIONS
THIS IS 6.2% OF TOTAL

STABILITY 1: 20 OBSERVATIONS, 0.5% OF THIS SECTOR, MEANSPEED 7.0 M/S

GROUP	1	2	3	4	5
OBS.	0	1	6	9	4
PROB.	0.0%	5.0%	30.0%	45.0%	20.0%
<U>	0.0M/S	2.5M/S	4.4M/S	7.3M/S	11.2M/S
<1/U>	9.999	0.400	0.239	0.139	0.090

STABILITY 2: 72 OBSERVATIONS, 1.8% OF THIS SECTOR, MEANSPEED 6.8 M/S

GROUP	1	2	3	4	5
OBS.	1	8	23	25	15
PROB.	1.4%	11.1%	31.9%	34.7%	20.8%
<U>	0.5M/S	1.8M/S	4.4M/S	7.5M/S	12.5M/S
<1/U>	9.999	0.568	0.237	0.137	0.082

STABILITY 3: 139 OBSERVATIONS, 3.4% OF THIS SECTOR, MEANSPEED 7.5 M/S

GROUP	1	2	3	4	5
OBS.	2	6	34	69	28
PROB.	1.4%	4.3%	24.5%	49.6%	20.1%
<U>	0.6M/S	2.4M/S	4.5M/S	7.6M/S	12.2M/S
<1/U>	9.999	0.444	0.230	0.134	0.084

STABILITY 4: 2561 OBSERVATIONS, 63.2% OF THIS SECTOR, MEANSPEED 7.0 M/S

GROUP	1	2	3	4	5
OBS.	18	252	774	1041	476
PROB.	0.7%	9.8%	30.2%	40.6%	18.6%
<U>	0.5M/S	2.1M/S	4.4M/S	7.6M/S	12.7M/S
<1/U>	9.999	0.523	0.236	0.134	0.082

STABILITY 5: 1066 OBSERVATIONS, 26.3% OF THIS SECTOR, MEANSPEED 5.6 M/S

GROUP	1	2	3	4	5
OBS.	39	170	365	403	89
PROB.	3.7%	15.9%	34.2%	37.8%	8.3%
<U>	0.4M/S	1.9M/S	4.3M/S	7.4M/S	12.3M/S
<1/U>	9.999	0.590	0.241	0.137	0.084

STABILITY 6: 164 OBSERVATIONS, 4.0% OF THIS SECTOR, MEANSPEED 3.8 M/S

GROUP	1	2	3	4	5
OBS.	18	56	49	35	6
PROB.	11.0%	34.1%	29.9%	21.3%	3.7%
<U>	0.3M/S	1.9M/S	4.1M/S	7.3M/S	11.0M/S
<1/U>	9.999	0.591	0.255	0.139	0.092

STABILITY 7: 28 OBSERVATIONS, 0.7% OF THIS SECTOR, MEANSPEED 2.4 M/S

GROUP	1	2	3	4	5
OBS.	2	18	6	2	0
PROB.	7.1%	64.3%	21.4%	7.1%	0.0%
<U>	0.5M/S	1.6M/S	4.2M/S	6.5M/S	0.0M/S
<1/U>	9.999	0.710	0.249	0.154	9.999

WINDSECTOR 1
3305 OBSERVATIONS
THIS IS 5.1% OF TOTAL

STABILITY 1: 7 OBSERVATIONS, 0.2% OF THIS SECTOR, MEANSPEED 6.4 M/S
GROUP 1 2 3 4 5
OBS. 0 1 1 4 1
PROB. 0.0% 14.3% 14.3% 57.1% 14.3%
<U> 0.0M/S 1.0M/S 4.5M/S 7.1M/S 10.0M/S
<1/U> 9.999 0.526 0.222 0.143 0.100

STABILITY 2: 14 OBSERVATIONS, 0.4% OF THIS SECTOR, MEANSPEED 6.1 M/S
GROUP 1 2 3 4 5
OBS. 0 3 5 4 2
PROB. 0.0% 21.4% 35.7% 28.6% 14.3%
<U> 0.0M/S 2.5M/S 4.8M/S 7.4M/S 12.4M/S
<1/U> 9.999 0.400 0.214 0.137 0.081

STABILITY 3: 38 OBSERVATIONS, 1.1% OF THIS SECTOR, MEANSPEED 6.8 M/S
GROUP 1 2 3 4 5
OBS. 0 3 16 10 9
PROB. 0.0% 7.9% 42.1% 26.3% 23.7%
<U> 0.0M/S 2.0M/S 4.2M/S 4.0M/S 11.9M/S
<1/U> 9.999 0.600 0.246 0.129 0.087

STABILITY 4: 2146 OBSERVATIONS, 65.0% OF THIS SECTOR, MEANSPEED 6.4 M/S
GROUP 1 2 3 4 5
OBS. 25 209 694 946 274
PROB. 1.2% 9.7% 32.3% 44.0% 12.8%
<U> 0.6M/S 2.0M/S 4.4M/S 7.5M/S 11.9M/S
<1/U> 9.999 0.550 0.240 0.136 0.086

STABILITY 5: 871 OBSERVATIONS, 26.4% OF THIS SECTOR, MEANSPEED 5.2 M/S
GROUP 1 2 3 4 5
OBS. 28 137 338 341 27
PROB. 3.2% 15.7% 38.8% 39.2% 3.1%
<U> 0.4M/S 1.9M/S 4.4M/S 7.3M/S 10.8M/S
<1/U> 9.999 0.591 0.238 0.140 0.093

STABILITY 6: 191 OBSERVATIONS, 5.8% OF THIS SECTOR, MEANSPEED 4.2 M/S
GROUP 1 2 3 4 5
OBS. 15 48 82 43 3
PROB. 7.9% 25.1% 42.9% 22.5% 1.6%
<U> 0.3M/S 2.2M/S 4.4M/S 7.0M/S 10.6M/S
<1/U> 9.999 0.491 0.238 0.145 0.094

STABILITY 7: 36 OBSERVATIONS, 1.1% OF THIS SECTOR, MEANSPEED 3.4 M/S
GROUP 1 2 3 4 5
OBS. 3 10 20 3 0
PROB. 8.3% 27.8% 55.6% 8.3% 0.0%
<U> 0.5M/S 1.8M/S 4.1M/S 7.5M/S 0.0M/S
<1/U> 9.999 0.659 0.249 0.134 9.999

WINDSECTOR 2
2656 OBSERVATIONS
THIS IS 4.1% OF TOTAL

STABILITY 1: 12 OBSERVATIONS, 0.5% OF THIS SECTOR, MEANSPEED 4.1 M/S
GROUP 1 2 3 4 5
OBS. 1 3 5 3 0
PROB. 8.3% 25.0% 41.7% 25.0% 0.0%
<U> 0.5M/S 2.4M/S 3.9M/S 7.2M/S 0.0M/S
<1/U> 9.999 0.418 0.261 0.141 9.999

STABILITY 2: 12 OBSERVATIONS, 0.5% OF THIS SECTOR, MEANSPEED 4.7 M/S
GROUP 1 2 3 4 5
OBS. 0 1 9 2 0
PROB. 0.0% 8.3% 75.0% 16.7% 0.0%
<U> 0.0M/S 2.8M/S 4.3M/S 7.6M/S 0.0M/S
<1/U> 9.999 0.357 0.242 0.132 9.999

STABILITY 3: 43 OBSERVATIONS, 1.6% OF THIS SECTOR, MEANSPEED 4.9 M/S
GROUP 1 2 3 4 5
OBS. 0 5 23 15 0
PROB. 0.0% 11.6% 53.5% 34.9% 0.0%
<U> 0.0M/S 2.3M/S 4.2M/S 6.9M/S 0.0M/S
<1/U> 9.999 0.440 0.248 0.148 9.999

STABILITY 4: 1532 OBSERVATIONS, 57.7% OF THIS SECTOR, MEANSPEED 5.3 M/S
GROUP 1 2 3 4 5
OBS. 23 244 648 547 70
PROB. 1.5% 15.9% 42.3% 35.7% 4.6%
<U> 0.6M/S 2.0M/S 4.4M/S 7.4M/S 11.1M/S
<1/U> 9.999 0.547 0.239 0.138 0.091

STABILITY 5: 812 OBSERVATIONS, 30.6% OF THIS SECTOR, MEANSPEED 4.3 M/S
GROUP 1 2 3 4 5
OBS. 23 217 371 191 10
PROB. 2.8% 26.7% 45.7% 23.5% 1.2%
<U> 0.5M/S 2.0M/S 4.3M/S 7.0M/S 10.7M/S
<1/U> 9.999 0.551 0.244 0.144 0.094

STABILITY 6: 222 OBSERVATIONS, 8.4% OF THIS SECTOR, MEANSPEED 3.8 M/S
GROUP 1 2 3 4 5
OBS. 14 62 111 35 0
PROB. 6.3% 27.9% 50.0% 15.8% 0.0%
<U> 0.4M/S 1.9M/S 4.3M/S 6.7M/S 0.0M/S
<1/U> 9.999 0.581 0.241 0.151 9.999

STABILITY 7: 23 OBSERVATIONS, 0.9% OF THIS SECTOR, MEANSPEED 3.4 M/S
GROUP 1 2 3 4 5
OBS. 5 5 11 2 0
PROB. 21.7% 21.7% 47.8% 8.7% 0.0%
<U> 0.4M/S 1.9M/S 5.0M/S 6.5M/S 0.0M/S
<1/U> 9.999 0.574 0.201 0.155 9.999

WINDSECTOR 3
4814 OBSERVATIONS
THIS IS 7.4% OF TOTAL

STABILITY 1: 48 OBSERVATIONS, 1.0% OF THIS SECTOR, MEANSPEED 9.6 M/S
GROUP 1 2 3 4 5
OBS. 0 0 13 11 24
PROB. 0.0% 0.0% 27.1% 22.9% 50.0%
<U> 0.0M/S 0.0M/S 4.4M/S 7.5M/S 13.5M/S
<1/U> 9.999 9.999 0.236 0.137 0.076

STABILITY 2: 61 OBSERVATIONS, 1.3% OF THIS SECTOR, MEANSPEED 9.4 M/S
GROUP 1 2 3 4 5
OBS. 0 1 3 33 24
PROB. 0.0% 1.6% 4.9% 54.1% 39.3%
<U> 0.0M/S 2.4M/S 5.4M/S 7.6M/S 12.8M/S
<1/U> 9.999 0.417 0.185 0.135 0.080

STABILITY 3: 141 OBSERVATIONS, 2.9% OF THIS SECTOR, MEANSPEED 8.9 M/S
GROUP 1 2 3 4 5
OBS. 1 1 27 61 51
PROB. 0.7% 0.7% 19.1% 43.3% 36.2%
<U> 0.5M/S 2.0M/S 4.8M/S 7.7M/S 12.8M/S
<1/U> 9.999 0.500 0.215 0.133 0.080

STABILITY 4: 2668 OBSERVATIONS, 55.4% OF THIS SECTOR, MEANSPEED 9.3 M/S
GROUP 1 2 3 4 5
OBS. 34 136 400 884 1214
PROB. 1.3% 5.1% 15.0% 33.1% 45.5%
<U> 0.5M/S 1.9M/S 4.5M/S 7.9M/S 12.9M/S
<1/U> 9.999 0.580 0.229 0.129 0.080

STABILITY 5: 1424 OBSERVATIONS, 29.6% OF THIS SECTOR, MEANSPEED 7.4 M/S
GROUP 1 2 3 4 5
OBS. 31 131 338 533 391
PROB. 2.2% 9.2% 23.7% 37.4% 27.5%
<U> 0.5M/S 2.0M/S 4.4M/S 7.9M/S 11.7M/S
<1/U> 9.999 0.550 0.239 0.129 0.087

STABILITY 6: 410 OBSERVATIONS, 8.5% OF THIS SECTOR, MEANSPEED 5.5 M/S
GROUP 1 2 3 4 5
OBS. 11 62 164 136 37
PROB. 2.7% 15.1% 40.0% 33.2% 9.0%
<U> 0.6M/S 1.8M/S 4.3M/S 7.6M/S 10.8M/S
<1/U> 9.999 0.635 0.243 0.135 0.093

STABILITY 7: 62 OBSERVATIONS, 1.3% OF THIS SECTOR, MEANSPEED 4.2 M/S
GROUP 1 2 3 4 5
OBS. 5 14 28 15 0
PROB. 8.1% 22.6% 45.2% 24.2% 0.0%
<U> 0.7M/S 2.0M/S 4.6M/S 6.6M/S 0.0M/S
<1/U> 9.999 0.554 0.231 0.153 9.999

WINDSECTOR 4
6140 OBSERVATIONS
THIS IS 9.4% OF TOTAL

STABILITY 1: 38 OBSERVATIONS, 0.6% OF THIS SECTOR, MEANSPEED 9.2 M/S
GROUP 1 2 3 4 5
OBS. 0 0 5 20 13
PROB. 0.0% 0.0% 13.2% 52.6% 34.2%
<U> 0.0M/S 0.0M/S 4.9M/S 8.2M/S 12.5M/S
<1/U> 9.999 9.999 0.210 0.125 0.082

STABILITY 2: 85 OBSERVATIONS, 1.4% OF THIS SECTOR, MEANSPEED 8.4 M/S
GROUP 1 2 3 4 5
OBS. 0 0 13 47 25
PROB. 0.0% 0.0% 15.3% 55.3% 29.4%
<U> 0.0M/S 0.0M/S 4.8M/S 7.8M/S 11.4M/S
<1/U> 9.999 9.999 0.215 0.130 0.089

STABILITY 3: 199 OBSERVATIONS, 3.2% OF THIS SECTOR, MEANSPEED 9.1 M/S
GROUP 1 2 3 4 5
OBS. 1 3 35 77 83
PROB. 0.5% 1.5% 17.6% 38.7% 41.7%
<U> 0.5M/S 1.9M/S 4.3M/S 7.8M/S 12.8M/S
<1/U> 9.999 0.563 0.243 0.130 0.080

STABILITY 4: 3703 OBSERVATIONS, 60.3% OF THIS SECTOR, MEANSPEED 9.6 M/S
GROUP 1 2 3 4 5
OBS. 18 136 564 1132 1853
PROB. 0.5% 3.7% 15.2% 30.6% 50.0%
<U> 0.5M/S 2.0M/S 4.5M/S 7.8M/S 12.9M/S
<1/U> 9.999 0.534 0.229 0.130 0.080

STABILITY 5: 1505 OBSERVATIONS, 24.5% OF THIS SECTOR, MEANSPEED 8.0 M/S
GROUP 1 2 3 4 5
OBS. 18 107 299 614 467
PROB. 1.2% 7.1% 19.9% 40.8% 31.0%
<U> 0.5M/S 2.0M/S 4.5M/S 7.8M/S 12.1M/S
<1/U> 9.999 0.554 0.230 0.131 0.084

STABILITY 6: 531 OBSERVATIONS, 8.6% OF THIS SECTOR, MEANSPEED 6.3 M/S
GROUP 1 2 3 4 5
OBS. 7 72 162 226 64
PROB. 1.3% 13.6% 30.5% 42.6% 12.1%
<U> 0.2M/S 2.1M/S 4.5M/S 7.7M/S 11.4M/S
<1/U> 9.999 0.504 0.228 0.132 0.089

STABILITY 7: 79 OBSERVATIONS, 1.3% OF THIS SECTOR, MEANSPEED 5.1 M/S
GROUP 1 2 3 4 5
OBS. 3 14 32 24 6
PROB. 3.8% 17.7% 40.5% 30.4% 7.6%
<U> 0.0M/S 1.9M/S 4.2M/S 7.4M/S 11.4M/S
<1/U> 9.999 0.584 0.247 0.139 0.089

WINDSECTOR 5
5912 OBSERVATIONS
THIS IS 9.1% OF TOTAL

STABILITY 11 46 OBSERVATIONS, 0.8% OF THIS SECTOR, MEANSPEED 8.2 M/S
GROUP 1 2 3 4 5
OBS. 0 5 6 17 18
PROB. 0.0% 10.9% 13.0% 37.0% 39.1%
<U> 0.0M/S 1.8M/S 4.8M/S 7.2M/S 12.1M/S
<1/U> 9.999 0.613 0.210 0.142 0.083

STABILITY 21 128 OBSERVATIONS, 2.2% OF THIS SECTOR, MEANSPEED 8.7 M/S
GROUP 1 2 3 4 5
OBS. 0 3 26 52 47
PROB. 0.0% 2.3% 20.3% 40.6% 36.7%
<U> 0.0M/S 2.6M/S 4.5M/S 7.6M/S 12.6M/S
<1/U> 9.999 0.390 0.228 0.135 0.081

STABILITY 31 268 OBSERVATIONS, 4.5% OF THIS SECTOR, MEANSPEED 8.0 M/S
GROUP 1 2 3 4 5
OBS. 0 9 65 109 85
PROB. 0.0% 3.4% 24.3% 40.7% 31.7%
<U> 0.0M/S 2.1M/S 4.7M/S 7.6M/S 11.8M/S
<1/U> 9.999 0.519 0.222 0.135 0.085

STABILITY 41 3173 OBSERVATIONS, 53.7% OF THIS SECTOR, MEANSPEED 8.5 M/S
GROUP 1 2 3 4 5
OBS. 17 128 603 1292 1133
PROB. 0.5% 4.0% 19.0% 40.7% 35.7%
<U> 0.4M/S 2.0M/S 4.5M/S 7.7M/S 12.3M/S
<1/U> 9.999 0.546 0.228 0.133 0.083

STABILITY 51 1660 OBSERVATIONS, 28.1% OF THIS SECTOR, MEANSPEED 8.2 M/S
GROUP 1 2 3 4 5
OBS. 15 102 327 636 580
PROB. 0.9% 6.1% 19.7% 38.3% 34.9%
<U> 0.6M/S 1.9M/S 4.5M/S 7.8M/S 12.1M/S
<1/U> 9.999 0.573 0.234 0.130 0.084

STABILITY 61 549 OBSERVATIONS, 9.3% OF THIS SECTOR, MEANSPEED 6.8 M/S
GROUP 1 2 3 4 5
OBS. 5 49 154 264 77
PROB. 0.9% 8.9% 28.1% 48.1% 14.0%
<U> 0.4M/S 2.1M/S 4.2M/S 7.7M/S 12.1M/S
<1/U> 9.999 0.495 0.245 0.132 0.084

STABILITY 71 88 OBSERVATIONS, 1.5% OF THIS SECTOR, MEANSPEED 6.4 M/S
GROUP 1 2 3 4 5
OBS. 0 7 30 48 3
PROB. 0.0% 8.0% 34.1% 54.5% 3.4%
<U> 0.0M/S 1.8M/S 4.5M/S 7.8M/S 13.7M/S
<1/U> 9.999 0.644 0.234 0.131 0.077

WINDSECTOR 6
4809 OBSERVATIONS
THIS IS 7.4% OF TOTAL

STABILITY 11 13 OBSERVATIONS, 0.3% OF THIS SECTOR, MEANSPEED 5.2 M/S
GROUP 1 2 3 4 5
OBS. 0 2 5 6 0
PROB. 0.0% 15.4% 38.5% 46.2% 0.0%
<U> 0.0M/S 2.0M/S 4.2M/S 7.0M/S 0.0M/S
<1/U> 9.999 0.533 0.246 0.145 0.999

STABILITY 21 33 OBSERVATIONS, 0.7% OF THIS SECTOR, MEANSPEED 5.1 M/S
GROUP 1 2 3 4 5
OBS. 0 5 16 12 0
PROB. 0.0% 15.2% 48.5% 36.4% 0.0%
<U> 0.0M/S 1.9M/S 4.4M/S 7.3M/S 0.0M/S
<1/U> 9.999 0.585 0.235 0.139 0.999

STABILITY 31 61 OBSERVATIONS, 1.3% OF THIS SECTOR, MEANSPEED 5.8 M/S
GROUP 1 2 3 4 5
OBS. 1 5 22 29 4
PROB. 1.6% 8.2% 36.1% 47.5% 6.6%
<U> 0.5M/S 2.3M/S 4.2M/S 7.2M/S 10.4M/S
<1/U> 9.999 0.440 0.250 0.142 0.096

STABILITY 41 2602 OBSERVATIONS, 54.1% OF THIS SECTOR, MEANSPEED 8.0 M/S
GROUP 1 2 3 4 5
OBS. 18 150 603 1057 774
PROB. 0.7% 5.8% 23.2% 40.6% 29.7%
<U> 0.6M/S 2.1M/S 4.5M/S 7.7M/S 12.3M/S
<1/U> 9.999 0.520 0.231 0.132 0.083

STABILITY 51 1609 OBSERVATIONS, 33.5% OF THIS SECTOR, MEANSPEED 7.7 M/S
GROUP 1 2 3 4 5
OBS. 14 113 359 699 424
PROB. 0.9% 7.0% 22.3% 43.4% 26.4%
<U> 0.5M/S 2.0M/S 4.5M/S 7.8M/S 11.8M/S
<1/U> 9.999 0.538 0.230 0.131 0.086

STABILITY 61 431 OBSERVATIONS, 9.0% OF THIS SECTOR, MEANSPEED 6.5 M/S
GROUP 1 2 3 4 5
OBS. 6 49 128 184 64
PROB. 1.4% 11.4% 29.7% 42.7% 14.8%
<U> 0.2M/S 2.1M/S 4.4M/S 7.7M/S 11.3M/S
<1/U> 9.999 0.532 0.237 0.133 0.089

STABILITY 71 60 OBSERVATIONS, 1.2% OF THIS SECTOR, MEANSPEED 5.1 M/S
GROUP 1 2 3 4 5
OBS. 0 13 29 14 4
PROB. 0.0% 21.7% 48.3% 23.3% 6.7%
<U> 0.0M/S 2.0M/S 4.3M/S 7.4M/S 12.5M/S
<1/U> 9.999 0.557 0.240 0.139 0.082

WINDSECTOR 7
7047 OBSERVATIONS
THIS IS 10.8% OF TOTAL

STABILITY 1: 18 OBSERVATIONS, 0.3% OF THIS SECTOR, MEANSPEED 5.4 M/S
GROUP 1 2 3 4 5
OBS. 0 7 6 9 0
PROB. 0.0% 16.7% 33.3% 50.0% 0.0%
<U> 0.0M/S 2.0M/S 4.7M/S 7.0M/S 0.0M/S
<I/U> 9.999 0.522 0.221 0.146 9.999

STABILITY 2: 53 OBSERVATIONS, 0.8% OF THIS SECTOR, MEANSPEED 6.4 M/S
GROUP 1 2 3 4 5
OBS. 1 7 14 26 5
PROB. 1.9% 13.2% 26.4% 49.1% 9.4%
<U> 0.5M/S 2.2M/S 4.6M/S 7.9M/S 11.1M/S
<I/U> 9.999 0.472 0.229 0.130 0.091

STABILITY 3: 140 OBSERVATIONS, 2.0% OF THIS SECTOR, MEANSPEED 6.6 M/S
GROUP 1 2 3 4 5
OBS. 0 11 43 68 18
PROB. 0.0% 7.9% 30.7% 48.6% 12.9%
<U> 0.0M/S 2.1M/S 4.4M/S 7.6M/S 11.0M/S
<I/U> 9.999 0.517 0.237 0.135 0.091

STABILITY 4: 4162 OBSERVATIONS, 59.1% OF THIS SECTOR, MEANSPEED 8.4 M/S
GROUP 1 2 3 4 5
OBS. 38 160 738 1881 1345
PROB. 0.9% 3.8% 17.7% 45.2% 32.3%
<U> 0.5M/S 2.0M/S 4.5M/S 7.9M/S 12.2M/S
<I/U> 9.999 0.538 0.229 0.129 0.084

STABILITY 5: 2254 OBSERVATIONS, 32.0% OF THIS SECTOR, MEANSPEED 7.8 M/S
GROUP 1 2 3 4 5
OBS. 21 120 453 1077 583
PROB. 0.9% 5.3% 20.1% 47.8% 25.9%
<U> 0.6M/S 1.9M/S 4.5M/S 7.9M/S 11.6M/S
<I/U> 9.999 0.562 0.229 0.130 0.087

STABILITY 6: 367 OBSERVATIONS, 5.2% OF THIS SECTOR, MEANSPEED 5.9 M/S
GROUP 1 2 3 4 5
OBS. 10 45 123 161 28
PROB. 2.7% 12.3% 33.5% 43.9% 7.6%
<U> 0.5M/S 1.9M/S 4.4M/S 7.7M/S 10.8M/S
<I/U> 9.999 0.602 0.238 0.133 0.093

STABILITY 7: 53 OBSERVATIONS, 0.8% OF THIS SECTOR, MEANSPEED 5.1 M/S
GROUP 1 2 3 4 5
OBS. 2 13 20 11 7
PROB. 3.8% 24.5% 37.7% 20.8% 13.2%
<U> 0.7M/S 1.9M/S 4.4M/S 7.3M/S 10.7M/S
<I/U> 9.999 0.590 0.237 0.142 0.094

WINDSECTOR 8
9104 OBSERVATIONS
THIS IS 14.0% OF TOTAL

STABILITY 1: 73 OBSERVATIONS, 0.8% OF THIS SECTOR, MEANSPEED 5.1 M/S
GROUP 1 2 3 4 5
OBS. 1 16 31 21 4
PROB. 1.4% 21.9% 42.5% 28.8% 5.5%
<U> 0.5M/S 1.7M/S 4.6M/S 7.4M/S 11.1M/S
<I/U> 9.999 0.627 0.221 0.138 0.091

STABILITY 2: 115 OBSERVATIONS, 1.3% OF THIS SECTOR, MEANSPEED 6.3 M/S
GROUP 1 2 3 4 5
OBS. 2 15 33 53 12
PROB. 1.7% 13.0% 28.7% 46.1% 10.4%
<U> 0.5M/S 1.9M/S 4.6M/S 7.6M/S 12.3M/S
<I/U> 9.999 0.588 0.226 0.135 0.083

STABILITY 3: 243 OBSERVATIONS, 2.7% OF THIS SECTOR, MEANSPEED 7.0 M/S
GROUP 1 2 3 4 5
OBS. 0 26 70 99 48
PROB. 0.0% 10.7% 28.8% 40.7% 19.8%
<U> 0.0M/S 2.0M/S 4.4M/S 7.8M/S 12.0M/S
<I/U> 9.999 0.541 0.235 0.131 0.085

STABILITY 4: 5924 OBSERVATIONS, 65.1% OF THIS SECTOR, MEANSPEED 8.5 M/S
GROUP 1 2 3 4 5
OBS. 33 228 963 2722 1978
PROB. 0.6% 3.8% 16.3% 45.9% 33.4%
<U> 0.6M/S 2.0M/S 4.6M/S 7.9M/S 12.2M/S
<I/U> 9.999 0.554 0.227 0.129 0.084

STABILITY 5: 2373 OBSERVATIONS, 26.1% OF THIS SECTOR, MEANSPEED 7.3 M/S
GROUP 1 2 3 4 5
OBS. 21 148 558 1170 476
PROB. 0.9% 6.2% 23.5% 49.3% 20.1%
<U> 0.4M/S 2.0M/S 4.5M/S 7.7M/S 11.7M/S
<I/U> 9.999 0.557 0.231 0.132 0.087

STABILITY 6: 350 OBSERVATIONS, 3.8% OF THIS SECTOR, MEANSPEED 5.4 M/S
GROUP 1 2 3 4 5
OBS. 6 42 144 153 5
PROB. 1.7% 12.0% 41.1% 43.7% 1.4%
<U> 0.3M/S 2.1M/S 4.4M/S 7.3M/S 10.7M/S
<I/U> 9.999 0.520 0.238 0.139 0.094

STABILITY 7: 26 OBSERVATIONS, 0.3% OF THIS SECTOR, MEANSPEED 3.9 M/S
GROUP 1 2 3 4 5
OBS. 0 7 14 5 0
PROB. 0.0% 26.9% 53.8% 19.2% 0.0%
<U> 0.0M/S 2.1M/S 3.9M/S 6.4M/S 0.0M/S
<I/U> 9.999 0.471 0.261 0.156 9.999

WINDSECTOR 9
8378 OBSERVATIONS
THIS IS 12.9% OF TOTAL

STABILITY 1: 143 OBSERVATIONS, 1.7% OF THIS SECTOR, MEANSPEED 6.7 M/S
GROUP 1 2 3 4 5
OBS. 0 14 49 51 29
PROB. 0.0% 9.8% 34.3% 35.7% 20.3%
<U> 0.0M/S 1.8M/S 4.4M/S 7.2M/S 11.9M/S
<1/U> 9.999 0.590 0.234 0.142 0.085

STABILITY 2: 197 OBSERVATIONS, 2.4% OF THIS SECTOR, MEANSPEED 7.8 M/S
GROUP 1 2 3 4 5
OBS. 0 16 48 77 56
PROB. 0.0% 8.1% 24.4% 39.1% 28.4%
<U> 0.0M/S 1.9M/S 4.6M/S 8.1M/S 11.7M/S
<1/U> 9.999 0.572 0.227 0.127 0.087

STABILITY 3: 368 OBSERVATIONS, 4.4% OF THIS SECTOR, MEANSPEED 8.7 M/S
GROUP 1 2 3 4 5
OBS. 3 12 69 146 138
PROB. 0.8% 3.3% 18.8% 39.7% 37.5%
<U> 0.5M/S 1.9M/S 4.6M/S 7.8M/S 12.4M/S
<1/U> 9.999 0.597 0.226 0.130 0.083

STABILITY 4: 5518 OBSERVATIONS, 65.9% OF THIS SECTOR, MEANSPEED 9.2 M/S
GROUP 1 2 3 4 5
OBS. 34 202 828 2234 2220
PROB. 0.6% 3.7% 15.0% 40.5% 40.2%
<U> 0.5M/S 2.0M/S 4.6M/S 7.9M/S 13.0M/S
<1/U> 9.999 0.558 0.226 0.129 0.079

STABILITY 5: 1876 OBSERVATIONS, 22.4% OF THIS SECTOR, MEANSPEED 8.1 M/S
GROUP 1 2 3 4 5
OBS. 22 111 410 834 499
PROB. 1.2% 5.9% 21.9% 44.5% 26.6%
<U> 0.4M/S 2.1M/S 4.5M/S 7.7M/S 13.4M/S
<1/U> 9.999 0.530 0.231 0.133 0.078

STABILITY 6: 235 OBSERVATIONS, 2.8% OF THIS SECTOR, MEANSPEED 5.0 M/S
GROUP 1 2 3 4 5
OBS. 3 30 124 73 5
PROB. 1.3% 12.8% 52.8% 31.1% 2.1%
<U> 0.5M/S 1.9M/S 4.5M/S 7.1M/S 10.5M/S
<1/U> 9.999 0.574 0.233 0.144 0.095

STABILITY 7: 41 OBSERVATIONS, 0.5% OF THIS SECTOR, MEANSPEED 4.0 M/S
GROUP 1 2 3 4 5
OBS. 1 11 24 5 0
PROB. 2.4% 26.8% 58.5% 12.2% 0.0%
<U> 0.5M/S 2.2M/S 4.3M/S 6.9M/S 0.0M/S
<1/U> 9.999 0.465 0.239 0.146 9.999

WINDSECTOR 10
4986 OBSERVATIONS
THIS IS 7.7% OF TOTAL

STABILITY 1: 211 OBSERVATIONS, 4.2% OF THIS SECTOR, MEANSPEED 6.1 M/S
GROUP 1 2 3 4 5
OBS. 2 20 86 84 19
PROB. 0.9% 9.5% 40.8% 39.8% 9.0%
<U> 0.5M/S 2.2M/S 4.5M/S 7.5M/S 11.7M/S
<1/U> 9.999 0.478 0.231 0.136 0.087

STABILITY 2: 199 OBSERVATIONS, 4.0% OF THIS SECTOR, MEANSPEED 7.1 M/S
GROUP 1 2 3 4 5
OBS. 0 22 61 77 39
PROB. 0.0% 11.1% 30.7% 38.7% 19.6%
<U> 0.0M/S 2.0M/S 4.5M/S 7.8M/S 12.9M/S
<1/U> 9.999 0.560 0.229 0.131 0.082

STABILITY 3: 300 OBSERVATIONS, 6.0% OF THIS SECTOR, MEANSPEED 8.1 M/S
GROUP 1 2 3 4 5
OBS. 0 26 79 105 90
PROB. 0.0% 8.7% 26.3% 35.0% 30.0%
<U> 0.0M/S 2.2M/S 4.5M/S 7.9M/S 13.2M/S
<1/U> 9.999 0.482 0.230 0.130 0.080

STABILITY 4: 2893 OBSERVATIONS, 58.0% OF THIS SECTOR, MEANSPEED 8.5 M/S
GROUP 1 2 3 4 5
OBS. 23 230 551 1100 989
PROB. 0.8% 8.0% 19.0% 38.0% 34.2%
<U> 0.5M/S 2.0M/S 4.5M/S 7.8M/S 13.1M/S
<1/U> 9.999 0.553 0.232 0.131 0.079

STABILITY 5: 1256 OBSERVATIONS, 25.2% OF THIS SECTOR, MEANSPEED 7.5 M/S
GROUP 1 2 3 4 5
OBS. 15 136 342 431 332
PROB. 1.2% 10.8% 27.2% 34.3% 26.4%
<U> 0.5M/S 1.9M/S 4.5M/S 7.6M/S 13.3M/S
<1/U> 9.999 0.595 0.230 0.135 0.078

STABILITY 6: 118 OBSERVATIONS, 2.4% OF THIS SECTOR, MEANSPEED 4.4 M/S
GROUP 1 2 3 4 5
OBS. 4 31 56 24 3
PROB. 3.4% 26.3% 47.5% 20.3% 2.5%
<U> 0.6M/S 2.0M/S 4.3M/S 7.4M/S 11.2M/S
<1/U> 9.999 0.529 0.242 0.137 0.091

STABILITY 7: 9 OBSERVATIONS, 0.2% OF THIS SECTOR, MEANSPEED 2.4 M/S
GROUP 1 2 3 4 5
OBS. 0 5 3 1 0
PROB. 0.0% 55.6% 33.3% 11.1% 0.0%
<U> 0.0M/S 1.3M/S 3.2M/S 6.0M/S 0.0M/S
<1/U> 9.999 0.833 0.317 0.167 9.999

WINUSECTOR 11
3913 OBSERVATIONS
THIS IS 6.0% OF TOTAL

STABILITY 1: 132 OBSERVATIONS, 3.4% OF THIS SECTOR, MEANSPEED 5.0 M/S
GROUP 1 2 3 4 5
OBS. 0 14 85 20 5
PROB. 0.0% 10.6% 64.4% 21.2% 3.8%
<U> 0.0M/S 2.3M/S 4.3M/S 7.4M/S 11.1M/S
<1/U> 9.999 0.446 0.241 0.138 0.091

STABILITY 2: 144 OBSERVATIONS, 3.7% OF THIS SECTOR, MEANSPEED 5.9 M/S
GROUP 1 2 3 4 5
OBS. 0 10 63 59 12
PROB. 0.0% 6.9% 43.8% 41.0% 8.3%
<U> 0.0M/S 2.1M/S 4.3M/S 7.2M/S 11.1M/S
<1/U> 9.999 0.485 0.240 0.141 0.091

STABILITY 3: 238 OBSERVATIONS, 6.1% OF THIS SECTOR, MEANSPEED 6.5 M/S
GROUP 1 2 3 4 5
OBS. 0 21 94 90 33
PROB. 0.0% 8.8% 39.5% 37.8% 13.9%
<U> 0.0M/S 2.2M/S 4.5M/S 7.6M/S 12.0M/S
<1/U> 9.999 0.492 0.233 0.134 0.086

STABILITY 4: 2307 OBSERVATIONS, 59.0% OF THIS SECTOR, MEANSPEED 7.5 M/S
GROUP 1 2 3 4 5
OBS. 20 271 633 791 592
PROB. 0.9% 11.7% 27.4% 34.3% 25.7%
<U> 0.5M/S 2.1M/S 4.4M/S 7.6M/S 13.3M/S
<1/U> 9.999 0.526 0.239 0.134 0.078

STABILITY 5: 921 OBSERVATIONS, 23.5% OF THIS SECTOR, MEANSPEED 6.4 M/S
GROUP 1 2 3 4 5
OBS. 17 127 317 310 150
PROB. 1.8% 13.8% 34.4% 33.7% 16.3%
<U> 0.4M/S 2.0M/S 4.4M/S 7.5M/S 12.9M/S
<1/U> 9.999 0.533 0.236 0.136 0.081

STABILITY 6: 152 OBSERVATIONS, 3.9% OF THIS SECTOR, MEANSPEED 4.3 M/S
GROUP 1 2 3 4 5
OBS. 8 52 55 29 8
PROB. 5.3% 34.2% 36.2% 19.1% 5.3%
<U> 0.4M/S 1.9M/S 4.1M/S 7.9M/S 11.8M/S
<1/U> 9.999 0.584 0.260 0.128 0.087

STABILITY 7: 19 OBSERVATIONS, 0.5% OF THIS SECTOR, MEANSPEED 3.5 M/S
GROUP 1 2 3 4 5
OBS. 0 7 10 2 0
PROB. 0.0% 36.8% 52.6% 10.5% 0.0%
<U> 0.0M/S 1.8M/S 4.2M/S 6.0M/S 0.0M/S
<1/U> 9.999 0.608 0.249 0.167 9.999

Graphs

On the following 12 pages some of the data are displayed graphically.

Fig. 1 is a wind rose over the probability of having the wind in the different sectors. As expected, the figure shows that westerly to south westerly winds are prevailing.

Figs. 2 to 5 are wind roses over the probability of having the wind in a given sector simultaneously with the presence of a certain stability. This distribution is calculated in tables 1 to 7. Note that the figures are drawn to the same scale. Note also that the summed probability over a wind rose pertaining to a given stability category S, is the probability P_S of finding the stability S. It is seen that the two stability classes 4 and 5 account for more than 87 % of all cases. Only for these two classes, the frequency distribution on wind-speed intervals are shown.

Figs. 6 to 12 are wind roses displaying the average velocities for the various stability classes. A comparison of the figures shows how the average velocity decreases from the maximum value in the neutral case towards smaller values in stable and unstable stratification.

Fig. 1

The probability of having the wind in the different sectors.

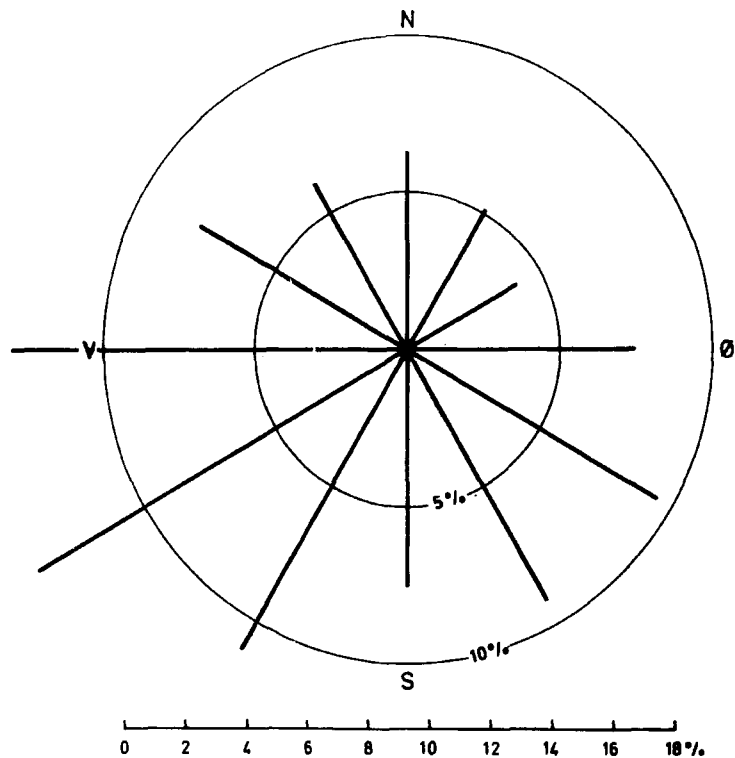
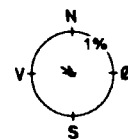
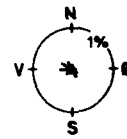


Fig. 2

The probability of having the wind in a given sector simultaneously with the presence of a certain stability.



Stability class 1.



Stability class 2.

Stability class 3.

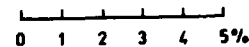
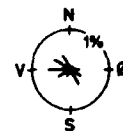


Fig. 3

The probability of having the wind in a given sector simultaneously with the presence of a certain stability.

Stability class 4.

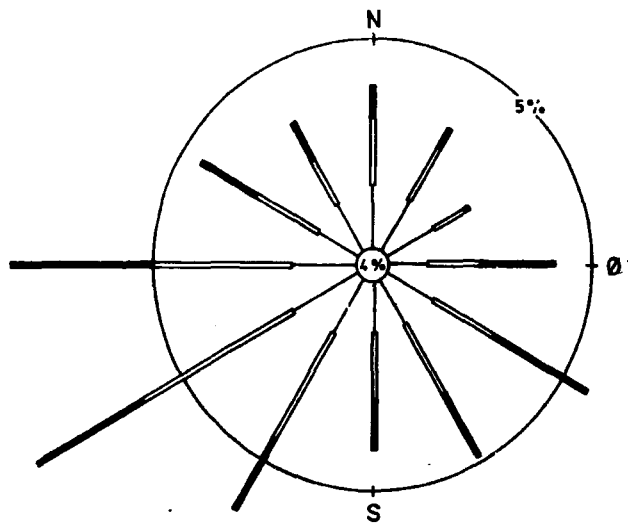


Fig. 4

The probability of having the wind in a given sector simultaneously with the presence of a certain stability.

Stability class 5.

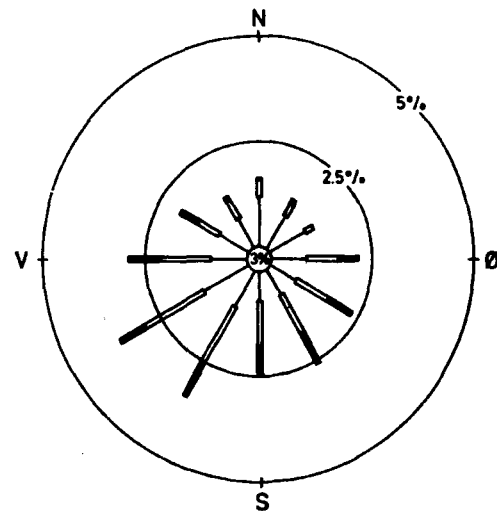


Fig. 5

The probability of having the wind in a given sector simultaneously with the presence of a certain stability.

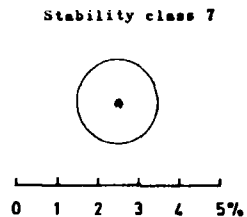
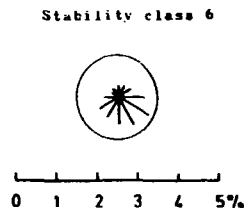


Fig. 6

Average velocities for stability class 1.

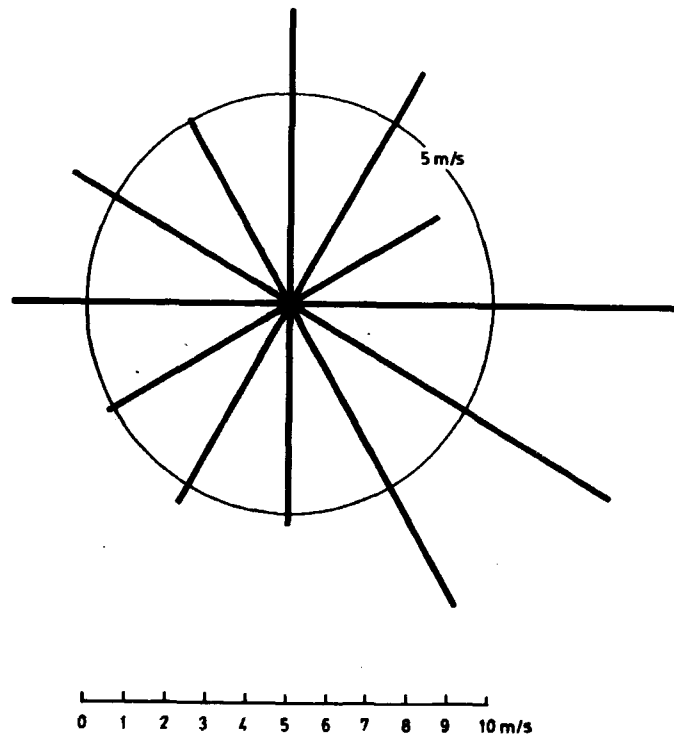


Fig. 7

Average velocities for stability class 2.

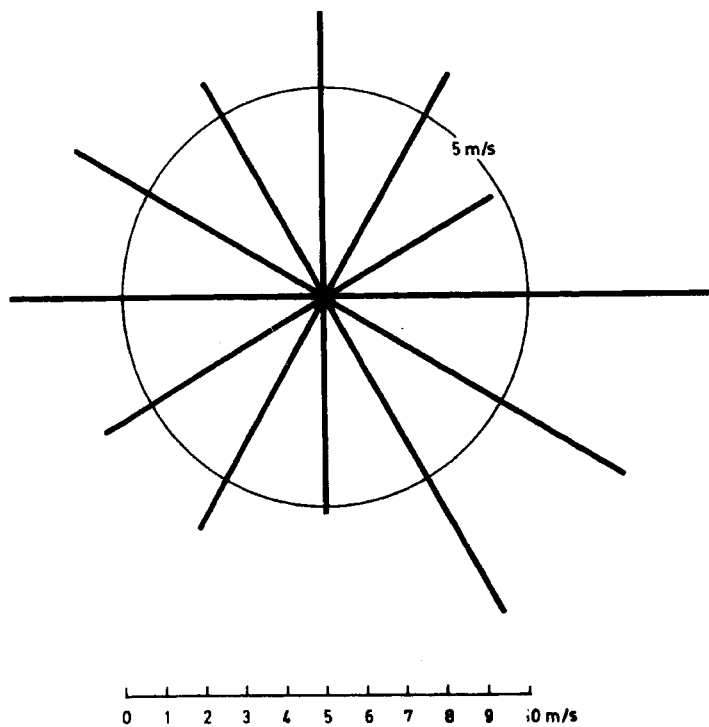


Fig. 8

Average velocities for stability class 3.

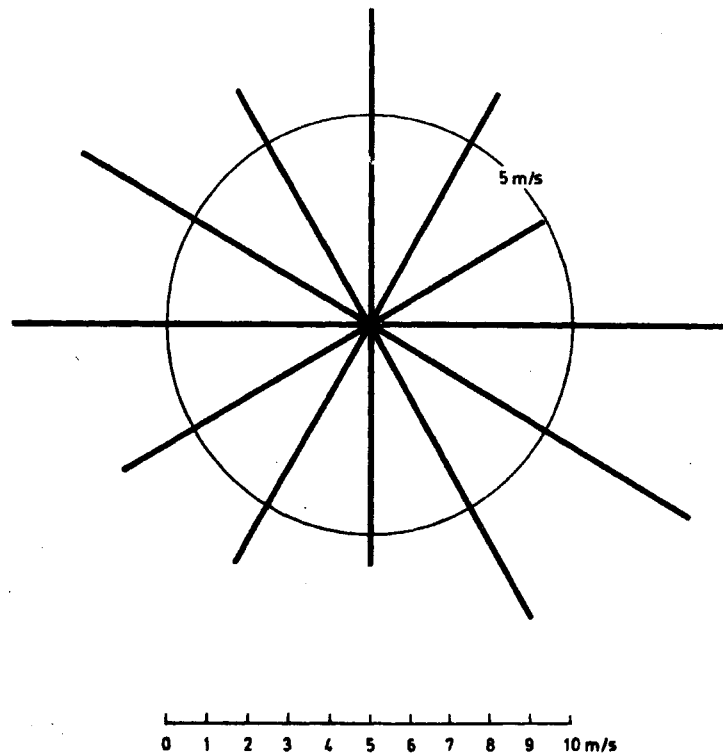


Fig. 9

Average velocities for stability class 4.

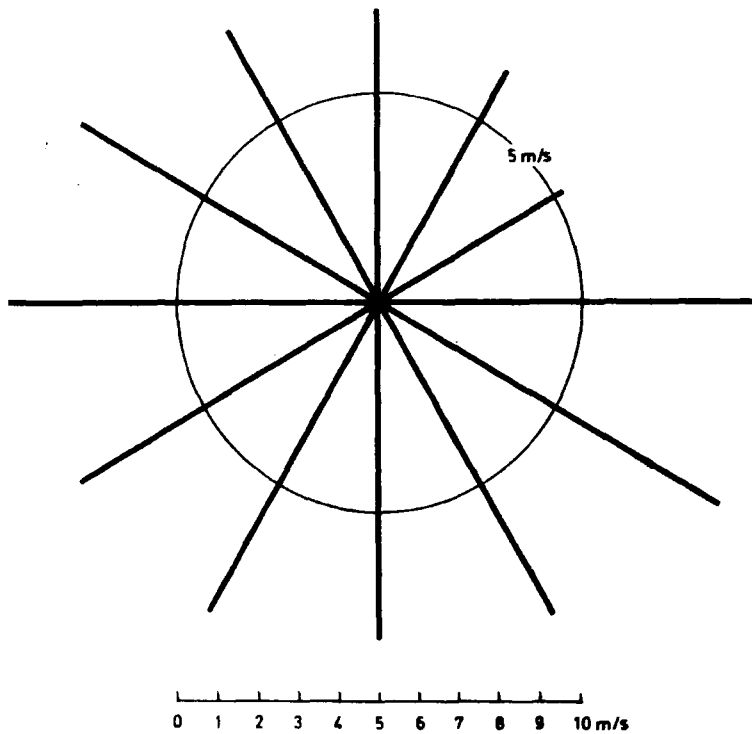


Fig. 10

Average velocities for stability class 5.

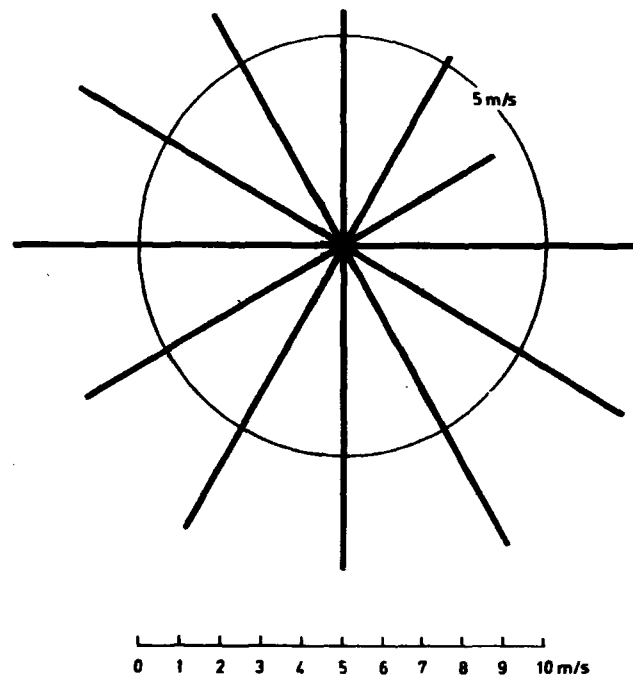


Fig. 11

Average velocities for stability class 6.

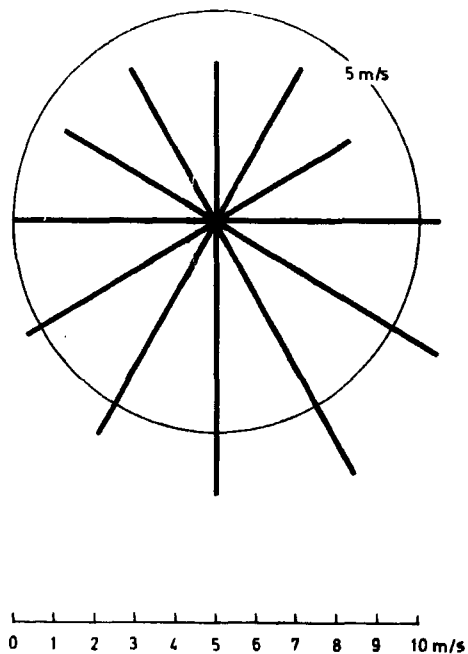
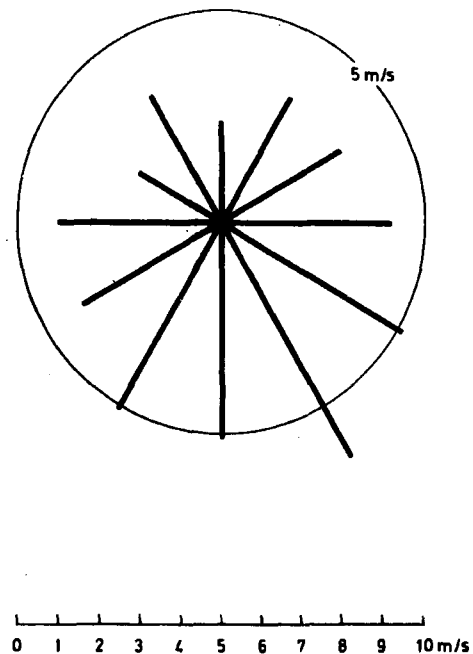


Fig. 12

Average velocities for stability class 7.



Stability class 1

Wind-direction sector N	P_n %	P_s %	$P_n \cdot P_s$ %
0	6.2	0.5	0.031
1	5.1	0.2	0.010
2	4.1	0.5	0.021
3	7.4	1.0	0.074
4	9.4	0.6	0.056
5	9.1	0.8	0.073
6	7.4	0.3	0.022
7	10.8	0.3	0.032
8	14.0	0.8	0.112
9	12.9	1.7	0.219
10	7.7	4.2	0.323
11	6.0	3.4	0.204
			1.177 %

The probability of having the wind in a given sector simultaneously with the presence of a certain stability

Stability class 2

Wind-direction sector N	P_n %	P_s %	$P_n \cdot P_s$ %
0	6.2	1.8	0.112
1	5.1	0.4	0.020
2	4.1	0.5	0.021
3	7.4	1.3	0.096
4	9.4	1.4	0.132
5	9.1	2.2	0.200
6	7.4	0.7	0.052
7	10.8	0.8	0.086
8	14.0	1.3	0.182
9	12.9	2.4	0.310
10	7.7	4.0	0.308
11	6.0	3.7	0.222
			1.741 %

The probability of having the wind in a given sector simultaneously with the presence of a certain stability

Stability class 3

Wind-direction sector N	P_n %	P_s %	$P_n \cdot P_s$ %
0	6.2	3.4	0.211
1	5.1	1.1	0.056
2	4.1	1.6	0.066
3	7.4	2.9	0.214
4	9.4	3.2	0.301
5	9.1	4.5	0.409
6	7.4	1.3	0.096
7	10.8	2.0	0.216
8	14.0	2.7	0.377
9	12.9	4.4	0.567
10	7.7	6.0	0.462
11	6.0	6.1	0.366
			3.341 %

The probability of having the wind in a given sector simultaneously with the presence of a certain stability

Stability class 4

Wind-direction sector N	P_n %	P_s %	$P_n \cdot P_s$ %
0	6.2	63.2	3.918
1	5.1	65.0	3.315
2	4.1	57.7	2.365
3	7.4	55.4	4.099
4	9.4	60.3	5.668
5	9.1	53.7	4.886
6	7.4	54.1	4.003
7	10.8	59.1	6.382
8	14.0	65.1	9.114
9	12.9	65.9	8.501
10	7.7	58.0	4.466
11	6.0	59.0	3.540
			60.257 %

The probability of having the wind in a given sector simultaneously with the presence of a certain stability

Stability class 5

Wind-direction sector N	P_n %	P_s %	$P_n \cdot P_s$ %
0	6.2	26.3	1.630
1	5.1	26.4	1.346
2	4.1	30.6	1.254
3	7.4	29.6	2.190
4	9.4	24.5	2.303
5	9.1	28.1	2.557
6	7.4	33.5	2.479
7	10.8	32.0	3.456
8	14.0	26.1	3.654
9	12.9	22.4	2.889
10	7.7	25.2	1.940
11	6.0	23.5	1.410
			27.108 %

The probability of having the wind in a given sector simultaneously with the presence of a certain stability

Stability class 6

Wind-direction sector N	P_n %	P_s %	$P_n \cdot P_s$ %
0	6.2	4.0	0.248
1	5.1	5.8	0.296
2	4.1	8.4	0.344
3	7.4	8.5	0.630
4	9.4	8.6	0.807
5	9.1	9.3	0.845
6	7.4	9.0	0.666
7	10.8	5.2	0.561
8	14.0	3.8	0.532
9	12.9	2.8	0.361
10	7.7	2.4	0.185
11	6.0	3.9	0.234
			5.709 %

The probability of having the wind in a given sector simultaneously with the presence of a certain stability

Stability class 7

Wind-direction sector N	P_n %	P_s %	$P_n \cdot P_s$ %
0	6.2	0.7	0.043
1	5.1	1.1	0.056
2	4.1	0.9	0.037
3	7.4	1.3	0.096
4	9.4	1.3	0.122
5	9.1	1.5	0.137
6	7.4	1.2	0.089
7	10.8	0.8	0.086
8	14.0	0.3	0.042
9	12.9	0.5	0.064
10	7.7	0.2	0.015
11	6.0	0.5	0.030
			0.817 %

The probability of having the wind in a given sector
simultaneously with the presence of a certain stability

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